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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE



# PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional): 907A.0141.U1(US)

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]

on Nov. 22, 2010

Signature Gail Conway

Typed or printed name Gail Conway

| Application Number | Filed |
|---|---|
| 10/820,347 | April 7, 2004 |

First Named Inventor: Hall et al.

| Art Unit | Examiner |
|---|---|
| 2611 | Timory, Kabir A. |

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

- ☐ applicant/inventor.
- ☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)
- ☑ attorney or agent of record. Registration number 41,180
- ☐ attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

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Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

**IN THE U.S. PATENT AND TRADEMARK OFFICE**

In re U.S. Patent Application of:

APPLICANT: Hall et al.

| | | | |
|---|---|---|---|
| SERIAL NO.: | 10/820,347 | FILING DATE: | April 7, 2004 |
| EXAMINER: | Timory, Kabir A. | ART UNIT: | 2611 |
| ATTORNEY'S DOCKET NO.: | 907A.0141.U1(US) | | |

TITLE: Digital Communications Method and System for Communicating Over Channels With Block Fading and Burst Jamming

Mail Stop AF
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P.O. BOX 1450
Alexandria, VA 22313-1450

**ARGUMENTS FOR A PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Sir:

This paper includes the arguments accompanying a Pre-Appeal Brief Request for Review and Notice of Appeal. The following is a concise recitation of **clear error** in the Examiner's rejections in this application. Claims 1-31 are pending and all claims are rejected under 35 U.S.C. §103(a) based in whole or in part on Ling (U.S. Patent Publication no. 2003/0043928). Applicant respectfully disagrees.

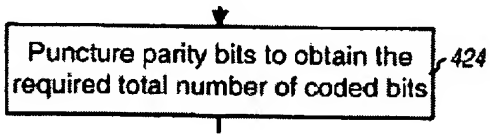
In independent claim 1 (and the other independent claims 14, 27, 30, and 31), zero symbols are inserted into a received symbol stream ***to replace symbols degraded by a detected symbol degrading event***. Ling states "Erasures (e.g., zero value indicatives) are then inserted by a de-puncturer 159 for coded bits punctured at system 110" (paragraph 29 of Ling). The Examiner uses the highlighted portion of the above in an argument that the "zero value indicatives" are inserted in order ***to replace symbols degraded by a detected symbol degrading event***. See, e.g., the Response to Arguments, Section 2.(1) from pages 2 to 3 of the outstanding final Office Action. Applicant respectfully submits this reasoning is clearly incorrect and will show explicitly why the erasures/zero value indicatives are inserted by the de-puncturer 159 for coded bits punctured at system 110 in Ling and further that these "erasures" are totally unrelated to zero symbols that are inserted into a received symbol stream to replace symbols degraded by a detected symbol degrading event.

At paragraphs [0088]-[0110], Ling describes puncturing. One version of puncturing is shown in FIG. 4A of Ling. What Ling makes clear is that the SNR is used to determine the number of information bits (step 414 and paragraph 92 of Ling). The total number of information bits is determined using the modulation scheme for each transmission channel (steps 416 and 418 and paragraphs 92-93). The total number of coded bits is next determined (step 420, paragraph 93) based on the total number of information bits and modulation schemes. See also paragraph 64, Table 1, of Ling, which shows the number of information and coded bits per symbol for different modulation schemes and SNR ranges. Applicant submits that what this table shows is that as SNR increases, for any given modulation scheme, more bits of information and fewer bits of coding would be sent.

Once the total number of information and coded bits are known, then the total number of information bits can be encoded (step 422). See below from Ling (emphasis added):

> [0094] At step 422, the total number of information bits determined in step 418 is encoded with a particular encoder. If a Turbo encoder is used, **the tail bits and parity bits generated by the encoder are punctured to obtain the total number of coded bits determined in step 420**. The unpunctured coded bits are then grouped into non-binary symbols, which are then mapped to modulation symbols for the transmission channels, at step 426.

The highlighted section is also described in step 424 of Ling:




What this means is that total number of coded bits is reduced to the required number of coded bits determined in step 420 of Ling by "puncturing" parity (or tail) bits. The word "puncturing" in this instance means "throwing away" or "deleting". In step 426 (see also paragraph 94), the unpunctured coded bits are mapped to modulation symbols. The

unpunctured, coded bits are those bits remaining after throwing away/deleting the parity (or tail) bits.

That is, in order to send the maximum number of allowed information bits, the total number of coded bits may be greater than the capacity of the transmission streams for the SNR, modulation, and coding schemes, and the capacity is determined by the total number of coded bits determined in step 420 of Ling. Therefore, Ling throws away/deletes parity (or tail) bits, while keeping all information bits. In other words, if there are 105 total coded bits from step 422 in Ling, but the total number of coded bits from step 420 is 100, 5 (five) parity/tail bits are simply thrown away/deleted in Ling.

That the word "puncturing" in this instance means "throwing away" or "deleting" is made clear by Ling in paragraphs 25 and 105, where "punctured" or "punctures" is explicitly defined as "deleted" or "deletes", respectively. It is clear therefore in Ling that tail/parity bits are simply thrown away/deleted prior to the rest of the coded bits being converted to symbols and the symbols transmitted.

Thus, when Ling states the following (emphasis added):

> [0139] De-puncturer 159 then inserts **"erasures" for code bits that have been deleted (i.e., punctured) at the transmitter**. The erasures typically have a value of zero ("0"), which is indicative of the punctured bit being equally likely to be a zero or a one.

It is clear (as further evident from the highlighted text) that the erasures are bits ***added*** at the receiver to correct for the bits thrown away/deleted prior to transmission by the transmitter. That is, a number of coded bits are received in Ling, and the number of required bits in order to perform decoding is larger than the number received. Bits are therefore added in Ling to increase the number of coded bits from the number received to the number required in order to perform decoding. These bits must be added in Ling in order to perform proper decoding. See, e.g., paragraphs 140-148 of Ling. See also paragraph 29 of Ling.

Thus, the "erasures" in Ling are bits inserted in received coded bits in order to provide the proper number of bits for error correction. The inserted bits in Ling are not zero ***symbols*** that are inserted into a received symbol stream ***to replace symbols degraded by a detected symbol degrading event.***

Furthermore, the Examiner's arguments imply that because there is fading, one skilled in the art would be motivated to replace a faded symbol with a zero symbol. However, there is no teaching or implication in Ling to this effect. For instance, FIG. 5 of Ling is reproduced below:

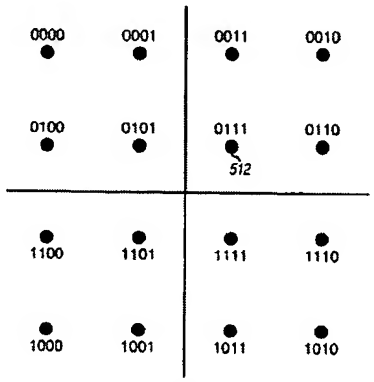



*FIG. 5*

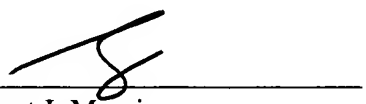
Ling describes this figure in paragraphs 0113, 0114 and states the following regarding this figure: "For 16-QAM, each modulation symbol represents a specific one of the 16 points in the signal constellation, with the specific point being determined by the value of the four coded bits" (paragraph 0114 of Ling, emphasis added). Thus, if the symbol representing 0010 is sent, but fading caused by, e.g., reducing each of the magnitudes of the I, Q values by about half (alternatively, reducing the magnitude of the I, Q vector by about half while keeping constant phase) causes the symbol representing 0111 to be received, the received symbol does not have to be replaced by anything. There are two bit errors (because 0**0**1**0** was sent but 0**1**1**1** received), but because bit/channel interleaving and error correcting codes are used in Ling, those two bit errors likely can be recovered from, ***without modifying the received symbol in any way***. Therefore, the effects of fading in Ling may be overcome

without modifying the received symbol. In fact, if one replaced the received 0111 with 0000 – which is what the Examiner appears to imply – this would cause an additional bit error and increase the number of bit errors. It is unclear why one skilled in the art would replace a received symbol with a zero symbol, based on the teachings in Ling.

Additionally, as described above, the "erasures" in Ling are bits inserted in received coded bits in order to provide the proper number of bits for error correction/decoding. These bits are not inserted relative to any detected "occurrence of a symbol degrading event for a received signal, wherein the symbol degrading event occurs after transmission and before reception of the received signal" as recited in independent claim 1. The Examiner states that "error detection is interpreted to be detecting the occurrence of symbol degrading" (see outstanding Office Action, page 7), but error detection in Ling occurs ***AFTER*** the bits have been inserted. In Ling, at the receiver, the bits are inserted to correct for tail or parity (i.e., error correcting) bits that were thrown away/deleted at the transmitter. Those tail or parity bits have to be added prior to error detection in order for the error detection mechanisms to operate on the correct number of bits. For instance, the encoder 114 adds error correction prior to puncturing (see paragraph 68 and FIG. 1 of Ling) and the decoder 162 occurs **AFTER** the de-puncturer 159 (which inserts zeros), and the decoder 162 is complementary to the encoder 114 (see paragraph 29 and FIG. 1 of Ling).

For at least these reasons, claim 1 is patentable over Ling. Because claim 1 is patentable and the rejections to all the other independent and dependent claims depend on Ling, the other independent claims 14, 27, 30, and 31 and their corresponding dependent claims are also patentable for at least the reasons given for claim 1.

Respectfully submitted:



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